Leap Day 2012 Tornadoes Across Southwestern Missouri

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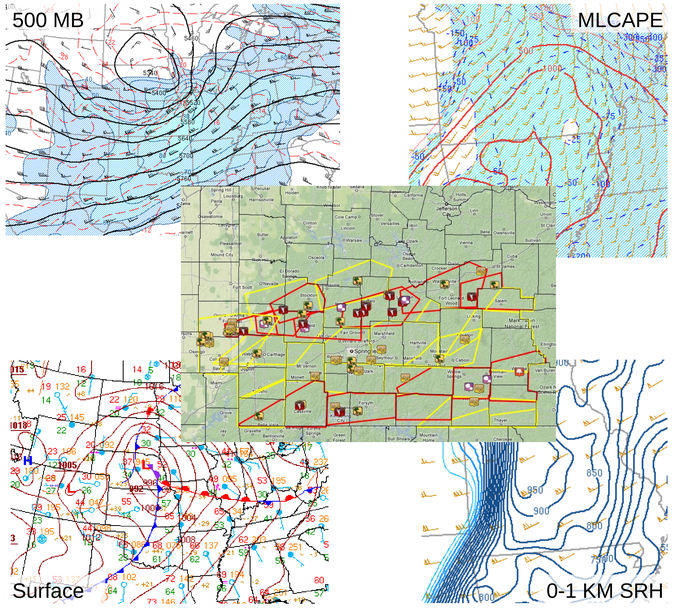
Event and Environment



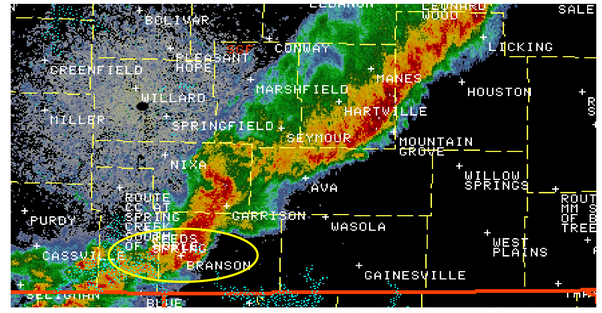
A QLCS, along with embedded supercells, pushed across southwestern Missouri during the early morning of 29 February 2012. Numerous reports of high winds and hail were received, along with 8 confirmed tornadoes. These storms resulted in 2 fatalities and 53 injuries.

The mesoscale environment ahead of this convection was primed for severe weather, with ample instability and extreme shear.

Objective analysis suggests the presence of 1000-1500 J Kg^{-1} of MLCAPE, with nearly 100 J Kg^{-1} in the lowest 3 km of the atmosphere. 0-6 km bulk shear was estimated to be near 70 kt, with 0-1 km storm relative helicity values approaching 1000 m^2 s^{-2}.

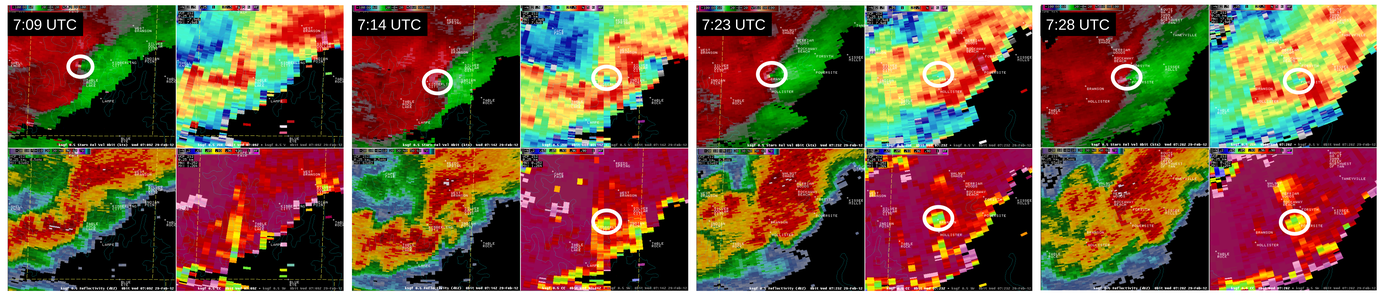
Table Rock Lake/Branson Tornado

A tornado developed across western portions of Table Rock Lake shortly after 2:00 AM, moving east through the U.S. 76 entertainment district in Branson, Missouri. Significant damage occurred to homes along the lake, as well as to many theaters in the Branson area. The tornado had a path length of 22 miles, and a maximum damage rating of EF-2.



Debris from this tornado resulted in a clear tornadic debris signature (TDS) on the Springfield WSR-88D.

The TDS gave staff at the Springfield Forecast Office the confidence needed to utilize enhanced wording in Tornado Warning statements and communication with area emergency managers and local media.

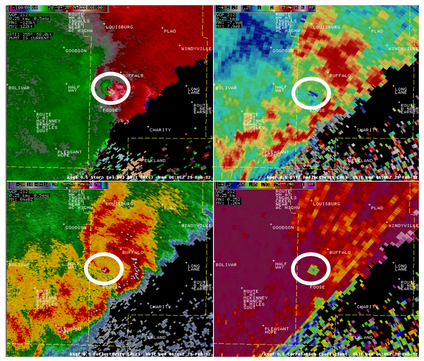


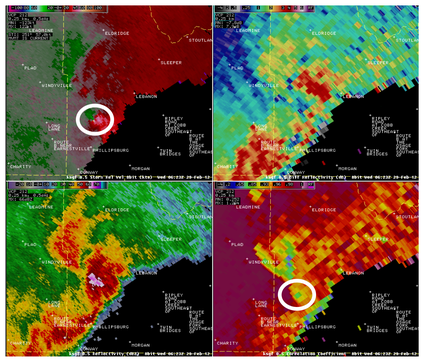
Progression of the tornadic storm from the KSGF WSR-88D (0.5° scan). Clockwise from top left: SRM, ZDR, CC, Z. The TDS is highlighted.

Buffalo and Lebanon Tornadoes

Right Image: An EF-2 rated tornado developed southwest of the town of Buffalo, Missouri around 1:00 AM, initially striking a large turkey farm. Debris from the farm was lofted over 10,000 ft into the atmosphere, resulting in a TDS and "debris ball" on the KSGF WSR-88D.

This storm went on to strike a trailer park near Buffalo, where one fatality and several injuries occurred.



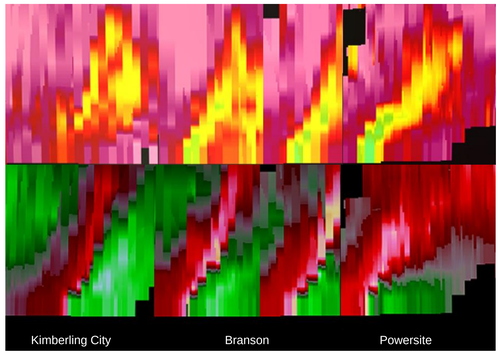


Left Image: The same convective cluster that caused the tornado in Buffalo went on to produce two additional tornadoes. The first was a short-lived tornado that caused damage along a quarter-mile path near Bennett Spring State Park. A few minutes later, an additional tornado formed west of Lebanon, MO, and produced damage along an 11 mile path into the far southwestern portion of the city limits. Both tornadoes were rated EF-1.

Decision Support Services

The recent upgrade to dual pol capabilities to the Springfield WSR-88D proved critical to timely decision support services during the Leap Day tornado event.

When on-duty staff recognized Tornadic Debris Signatures (TDSs) associated with the tornadoes in Branson and Buffalo, they were able to immediately utilize enhanced wording in Tornado Warnings and follow-up statements, even before damage reports began arriving from emergency managers and law enforcement.



A combined radar cross section showing the progression of the CC and SRM fields as a tornado moved east through Kimberling City, Branson, and Powersite, MO.

During this tornado event, on-duty staff provided enhanced decision support services using NWSChat and telephone once TDSs became evident. Staff confirmed the presence of a TDS with on-air media through NWSChat, giving television meteorologists the confidence to use stronger wording in communicating with the viewing public, likely eliciting more favorable responses to the tornado threat.

In addition, "heads-up" phone calls to emergency managers in downstream counties resulted in more aggressive actions being taken to warn citizens.